EVIDENCE FOR AN ASTEROIDAL ORIGIN OF THE TUNGUSKA OBJECT

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The progress in the understanding of the Tunguska object is reviewed in the light of evidence presented in numerous investigations, which appeared following the publication of my 1983 paper on the object's proposed asteroidal nature. The issues addressed extensively in the review involve: (1) the results yielded by seismic studies of the event on the object's energy, altitude, and velocity at the time of its terminal explosion; (2) the problem of atmospheric fragmentation and its implications for the ablation and deceleration of the impactor; and (3) estimates for the object's elemental components, for its preatmospheric mass and velocity, and for the orientation of its heliocentric orbit. Employed in the arguments are the results now available on the fragments of Comet Shoemaker-Levy 9 into Jupiter and the results of a comparative study of two huge fireballs (one cometary, one stony, both brought about by projectiles a few meters across) observed with the cameras of the Network of fireball monitoring. It is concluded that hypotheses based on the presumed cometary origin of the object encounter unsurmountable difficulties in each of the above categories of physical characteristics and that the event's explanation in terms of a stony projectile is not only plausible, but virtually certain.